

**ABSTRACT:**

Motorcycles are the most popular vehicles for motorised individual transport in Asia. Millions of motorcycles cause the majority of traffic-based air pollution [1]. A prototype of a clean, silent and fuel efficient hydrogen fuel cell powered Motorcycle demonstrates an alternative [2]. With the prototype of Pios Fuel Cell Motorcycle a proof of concept is done. "Pios" Fuel Cell Motorcycle is the latest prototype of a series of hydrogen fuel cell powered vehicles. The power train of the fuel cell motorcycle consists of fuel cell system, in hybrid with lithium polymer-ion battery and ultra capacitor module. A direct-coupled permanent magnet AC motor and an overrunning clutch coupled brushless DC motor are implemented as traction motors. To analysis different drive train configurations extensive dynamometer lab test were done. A comparison of direct fuel cell drive train with various hybridisation drive trains with ultra capacitor and lithium battery were systematically tested and analysed.